List of online resources for hmmTMB

Théo Michelot

2023-10-24

This document lists vignettes and other resources for the R package hmmTMB, which include details about its implementation, as well as several step-by-step analyses on various types of time series data. The vignettes are available on Github, rather than directly included in the CRAN version of the package, because generating them takes a long time.

Preprint

A description of the statistical background, implementation details, and several detailed examples, are provided in the following arXiv preprint: 'hmmTMB: hidden Markov models with flexible covariate effects in R' (Michelot (2022)).

Vignettes

- 'Analysing time series data with hidden Markov models in hmmTMB': Overview of package workflow, using detailed example based on analysis of energy prices. This is a good starting point to learn how to use the package.

- 'Bayesian inference in hmmTMB': Description of workflow for Bayesian analysis in hmmTMB, including specifying priors, and extracting posterior samples.

- 'Advanced features of hmmTMB': Description of some other useful functionalities, including (semi-)supervised learning, parameter constraints, selection of initial parameter values, etc.

- 'General dependence structures in hmmTMB': Implementation details for hidden Markov models (HMMs) with non-standard dependence structures, including hidden semi-Markov models, higher-order HMMs, autoregressive HMMs, and coupled HMMs.

- 'List of distributions in hmmTMB': List of observation distributions currently available in hmmTMB.

- 'Flexible animal movement modelling using hmmTMB': Description of wild haggis movement analysis, illustrating how non-parametric covariate effects can be included. This includes two different types of movement models: (1) correlated random walks based on step lengths and turning angles, and (2) correlated random walks based on locations directly.

- 'Occupancy modelling using hmmTMB': Analysis of occupancy data set of crossbill from Kéry, Guillera-Arroita, and Lahoz-Monfort (2013).

References

Kéry, Marc, Gurutzeta Guillera-Arroita, and José J Lahoz-Monfort. 2013. "Analysing and Mapping Species Range Dynamics Using Occupancy Models." *Journal of Biogeography* 40 (8): 1463–74.

Michelot, Théo. 2022. "HmmTMB: Hidden Markov Models with Flexible Covariate Effects in R." *arXiv Preprint arXiv:2211.14139*.